

Strategies for Use and Protection of the Gulf Islands Marine Environment

David McCallum*, Dept of Geography, University of Victoria

Rick Rollins, Dept of Tourism and Recreation, Malaspina University-College

Keywords: public perceptions, values, attitudes, Gulf Islands, zoning, MPAs

Introduction:

This study focuses on the attitudes and perceptions of Gulf Islands residents to different uses and protection strategies for the marine environment. It builds on previous studies that addressed similar questions with other stakeholder groups (Rollins & McCallum, 2003; Rollins & Randall, 2004, 2005). Components of the study include (1) values towards the marine environment; (2) perceptions of threats to the marine environment; and (3) opinions towards management of recreational boating, (4) of the shellfish aquaculture industry, and (5) of marine protected areas (MPAs).

There is tremendous potential for the further development of shellfish aquaculture on the coast of BC (Kingzett & Salmon, 2002). However, care must be taken to address potentially competing interests and address public perception before polarization of opinion is established. Shellfish are an indicator of a healthy marine environment, hence the potential compatibility with MPAs; however, shellfish aquaculture may be seen as visually unacceptable, or as a threat to desired boating anchorages or beach accesses, among other potential concerns. Recreational boating is already a significant activity and economic driver in the Gulf Islands and may continue to increase in popularity. Indeed, some may view recreational boating as a negative impact on the marine environment through its impacts such as sewage discharge, anchor damage, etc. A proposed large-scale MPA may be a potential solution to the conflict between these activities through spatial zoning and activity regulation (Laffoley, 1995; Kelleher & Recchia, 1998).

Methods:

We chose a random selection of 302 Gulf Islands residents from Thetis (n=51), Salt Spring (n=201), and Saturna (n=50) Islands, because each of these islands has existing shellfish aquaculture facilities nearby. The data collection instrument was a self-administered 10-page questionnaire. The “normative approach” (Inglis *et al.*, 1999; Heywood *et al.*, 2002; Vaske & Whittaker, 2004), involving the use of digitally modified photographs to depict a series of increasing levels of activity, was used in order to look at the possible visual impacts of both recreational boating and shellfish aquaculture. A margin of error of 5.5% at the 95% confidence level is reported. Overall response rate was good (73.8%) due to the “face-to-face” sampling method. Data were collected between June and September 2004.

Results and Discussion:

A list of 13 values (modified from Brown *et al.*, 2002) was presented and respondents were asked to rate the importance of each value and then choose their top two most important values (Q.3). Ranked from most important to least important, the descriptive results of the values are: *Conservation, Life Sustaining, Aesthetic, Recreation, Future, Intrinsic, Therapeutic, Spiritual, Subsistence, Economic, Learning, Historic, and Cultural*. A factor analysis (principle components analysis with varimax rotation) was conducted on the list of values, results of which produced three factors (or components) with an eigenvalue above one, including: (1) “Environmental”, (2) “Feel Good”, and (3) “Human Use”. The values loaded with factor scores as high as 0.81 and as low as 0.53. The overall alpha reliability coefficient for this analysis was 0.81.

Respondents were provided a list of 21 potential threats to the marine environment and asked to indicate their perception of the amount of impact from each threat (“no impact at all”, “moderate impact”, or “serious impact”) (Q.4). The most serious impacts on the marine environment by recreational activity were: (#1) *loss of habitat due to shoreline development (i.e. marinas)*, (#2) *noise from recreational vessels*, and (#3) *disturbance of whales from whale watching*. The least serious recreational threat to the marine environment was *damage to the ocean floor from anchors*. In terms of impacts from industry, the most serious impacts were perceived as (#1) *loss of habitat due to residential development*, (#2) *pollution from pulp mills*, and (#3) *over fishing due to commercial fishing*. Finally, in terms of threats to the marine

environment from sources of sewage, the most serious sources were perceived as (#1) *sewage from Vancouver Island Communities*, (#2) *sewage from recreational vessels*, (#3) *sewage from Gulf Islands communities*, and (#4) *sewage from commercial vessels*.

A series of 6 photos depicting increasing densities of *recreational boats* was presented and respondents were asked to indicate a level of acceptability for each photo (Q.6). This visual approach to normative theory is useful in measuring indicators and standards of quality (Needham & Rollins, 2005). Table 1 below shows the response percentages, as well as the mean and standard deviation (SD).

Table 1. Perceptions of the Visual Impact of Recreational Boating (Q.6)

| Photograph: | Response (%) | | | | | | Mean | SD |
|--------------|-----------------------|---------------------------|---------------|-----------------------------|-------------------------|-------------|-------|-------|
| | Very Acceptable +2 | Somewhat Acceptable +1 | Not Sure 0 | Somewhat Unacceptable -1 | Very Unacceptable -2 | No Response | | |
| Photograph A | 98.6 | 0.0 | 0.0 | 0.0 | 0.5 | 0.9 | 1.98 | 0.270 |
| Photograph B | 87.8 | 10.0 | 0.0 | 1.4 | 0.0 | 0.8 | 1.86 | 0.452 |
| Photograph C | 44.8 | 40.7 | 1.8 | 4.1 | 0.9 | 7.7 | 1.21 | 0.961 |
| Photograph D | 28.1 | 32.1 | 8.1 | 24.4 | 5.4 | 1.9 | 0.54 | 1.287 |
| Photograph E | 11.8 | 19.9 | 7.7 | 33.5 | 25.3 | 1.8 | -0.41 | 1.376 |
| Photograph F | 7.2 | 9.1 | 3.6 | 23.5 | 55.7 | 0.9 | -1.12 | 1.270 |

* n = 221

** Calculation of mean considers that “no response” is missing data

The same method was used to determine visual acceptability of *shellfish aquaculture* (Q.9). Table 2 below shows the results of the visual acceptability of the photo sequence.

Table 2. Perceptions of the Visual Impact of Shellfish Aquaculture (Q.9)

| Photograph: | Response (%) | | | | | | Mean | SD |
|--------------|-----------------------|---------------------------|---------------|-----------------------------|-------------------------|-------------|-------|-------|
| | Very Acceptable +2 | Somewhat Acceptable +1 | Not Sure 0 | Somewhat Unacceptable -1 | Very Unacceptable -2 | No Response | | |
| Photograph A | 94.6 | 2.3 | 1.4 | 0.5 | 0.0 | 1.2 | 1.94 | 0.340 |
| Photograph B | 30.3 | 43.0 | 1.8 | 8.1 | 15.4 | 1.4 | 0.66 | 1.397 |
| Photograph C | 14.0 | 35.3 | 5.4 | 18.6 | 24.9 | 1.8 | -0.05 | 1.463 |
| Photograph D | 4.1 | 14.9 | 5.9 | 27.6 | 45.7 | 1.8 | -0.98 | 1.230 |
| Photograph E | 2.3 | 5.4 | 3.2 | 18.1 | 69.7 | 1.3 | -1.50 | 0.961 |
| Photograph F | 2.3 | 5.0 | 2.3 | 12.7 | 76.5 | 1.2 | -1.58 | 0.933 |

* n = 221

** Calculation of mean considers that “no response” is missing data

A portion of the survey (Q.7) asked respondents about their perceptions of potential solutions for dealing with the issue of sewage from recreational boats, since there is not yet blanket legislation in Canada prohibiting sewage discharge. Results indicate that, of 5 potential solutions, the most support is for *introduction of compulsory “no discharge” regulations*, while the least support is for *designation of specific “no go” areas that apply to recreational boats and other vessels*.

Q.10 focussed on the potential benefits and potential concerns of the shellfish aquaculture industry. One statement addressed the conflict between the industry and recreational boating. To the statement, *some forms of shellfish aquaculture conflict with desired boating anchorages or beach accesses*, 64.9% responded “somewhat or strongly agree”, 7.3% responded “somewhat or strongly disagree”, and 25.2% responded “not sure”. There appears to be some degree of acceptability of shellfish aquaculture in the Gulf Islands, both in terms of its visual impact and its overall impact. However, a significant portion of respondents are “not sure” about the potential benefits and concerns of the industry and 42.7% responded “not sure” when asked about their overall perception of the industry.

Following the factor analysis as described above, a cluster analysis was conducted to separate respondents into clusters based on their responses to survey questions. The analysis determined clusters based on respondents’ factor scores for each of the three factors described above (“Environmental”, “Feel Good”, and “Human Use”). A two-cluster solution was chosen, from which (based on comparison of responses)

we were able to categorize respondents into either an “environmental” cluster or a “human-use” cluster. Significant (at $p < 0.05$) results include the “environmental” cluster as:

- **Positive** on “Environmental” factor
- **Negative** on “Feel Good” factor
- **Negative** on “Human Use” factor
- **Reside shorter** in Gulf Islands
- **More likely** to own a home
- **Less likely** employed in tourism **Less accepting** of higher densities of both shellfish aquaculture and recreational boats, based on the photos used in the survey.
- **More likely** to respond, “concerns outweigh benefits” regarding attitude towards shellfish aquaculture.

Actual Applications:

This type of social science research is useful to inform multiple-use coastal planning and to prevent conflict and confrontation before they are created. While many consider themselves “resource managers”, in fact we are truly “people managers”. Effective coastal planning takes into account the motives, behaviours, and values of various stakeholder groups. Token consultation is unacceptable as a lack of understanding and compliance may result and may lead to an unsuccessful conservation effort. This research will be useful to Parks Canada, DFO, BC Parks, Islands Trust and other regional governments, as well as ENGOs such as CPAWS or the Georgia Strait Alliance.

References:

- Brown, G., Reed, P., & Harris, C. (2002). Testing a Place-Based Theory for Environmental Evaluation: an Alaskan Case Study. *Applied Geography*, 22(1), 49-76.
- Heywood, J., Manning, R. E., & Vaske, J. J. (2002). Normative Research in Outdoor Recreation: Progress and Prospects for Continued Development and Applications. *Leisure Sciences*, 24, 251-253.
- Inglis, G., Johnson, V. I., & Ponte, F. (1999). Crowding Norms in Marine Settings: A Case Study of Snorkelling on the Great Barrier Reef. *Environmental Management*, 24(3), 369-381.
- Kelleher, G., & Recchia, R. (1998). Lessons from Marine Protected Areas Around the World. *Parks*, 8(2), 1-4.
- Kingzett, B., & Salmon, R. (2002). *Profile and Potential of the BC Shellfish Aquaculture Industry*. Nanaimo, BC: Vancouver Island Economic Developers Association.
- Laffoley, D. (1995). Techniques for Managing Marine Protected Areas: Zoning. In S. Gubbay (Ed.), *Marine Protected Areas: Principles and Techniques for Management*. London: Chapman & Hall.
- Needham, M. D., & Rollins, R. (2005). Interest Group Standards for Recreation and Tourism Impacts at Ski Areas in the Summer. *Tourism Management*, 26, 1-13.
- Rollins, R., & McCallum, D. (2003). *Perceptions of Environmental Conditions in the Proposed Southern Strait of Georgia NMCA*. Paper presented at the SAMPAA V, Victoria, BC.
- Rollins, R., & Randall, C. (2004). *Perceptions of Shellfish Growers Towards MPAs* (Unpublished Report). Nanaimo, BC: Malaspina University-College.
- Rollins, R., & Randall, C. (2005). *Perceptions of Scientists Regarding Indicators of Health of the Gulf Islands Marine Environment*. Paper presented at the Coastal Zone Management and Shellfish Aquaculture in BC: Current Research and Emerging Policy Priorities, Nanaimo, BC.
- Vaske, J., & Whittaker, D. (2004). Normative Approaches to Natural Resources. In M. Manfredo, J. Vaske, B. Bruyere, D. Field & P. Brown (Eds.), *Society and Natural Resources: A Summary of Knowledge*. Jefferson, Missouri: Modern Litho.